Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (currently amended). A method for multitone processing an N level digital image to produce an M level digital image wherein M and N have unchanging values and M<N, comprising the steps of:

a) determining M reconstruction levels based on the gray level distribution of the N level image; and

b) applying multilevel error diffusion to the N level digital image using the M reconstruction levels to produce the M level digital image;

wherein said determining further comprises assigning all of the pixels of said N level image into M groups corresponding to said M reconstruction levels and, following said assigning, calculating each of said M reconstruction levels using the pixels of the respective said group.

2 (previously presented). A method for multitone processing an N level digital image to produce an M level digital image wherein M<N, comprising the steps of:

a) determining M reconstruction levels based on the gray level distribution of the N level image; and

b) applying multilevel dithering to the N level digital image using the M reconstruction levels to produce the M level digital image;

wherein the determining step comprises performing a K-means clustering operation on the N level digital image, wherein K = M.

3 (previously presented). A method for multitone processing an N level digital image to produce an M level digital image wherein M<N, comprising the steps of:

a) determining M reconstruction levels based on the gray level distribution of the N level image; and

b) applying multilevel error diffusion to the N level digital image using said M reconstruction levels to produce the M level digital image;

wherein the determining step comprises forming a histogram of the N level digital image and locating said M reconstruction levels corresponding to the M most prominent peaks in the histogram.

4 (original). The method claimed in claim 1, wherein the first and last levels of the M levels are predetermined.

5 (original). The method claimed in claim 4, wherein the first level is zero.

6 (original). The method claimed in claim 4, wherein the last level is the maximum possible level.

7 (previously presented). The method claimed in claim 1, wherein the N level digital image has multiple channels and K-means clustering and multi-level error diffusion are performed on each of the multiple channels independently.

8 (previously presented). The method claimed in claim 1, wherein the N level digital image has multiple channels and K-means clustering and multi-level error diffusion are performed in multi-channel vector space.

9 (previously presented). The method claimed in claim 1, wherein the multi-level error diffusion is vector error diffusion.

10 (previously presented). The method claimed in claim 7, wherein the multi-level error diffusion is vector error diffusion.

11 (previously presented). The method claimed in claim 8, wherein the multi-level error diffusion is vector error diffusion.

12 (previously presented). A computer program product comprising computer readable storage medium having a computer program stored thereon for performing the method of claim 1.

13 (previously presented). The method of claim 3 wherein the first and last levels of the M levels are predetermined.

14 (previously presented). The method of claim 3 wherein the N level digital image has multiple channels and said determining and applying steps are applied to each of said multiple channels independently.

15 (previously presented). The method of claim 3 wherein the N level digital image has multiple channels and said determining and applying steps are performed in multi-channel vector space.

16 (currently amended). A method for multitone processing an N level digital image to produce an M level digital image wherein M and N have unchanging values and $M<N$, comprising the steps of:

clustering all of the pixel values of the N level image into M reconstruction levels based on the gray level distribution of the N level image;

repeatedly revising said clustering of said pixel values into said reconstruction levels until error between the N level digital image and the M level digital image is minimized; and

applying multilevel error diffusion to the N level digital image using said M reconstruction levels to produce the M level digital image.

17 (previously presented). The method of claim 16 wherein said clustering and minimizing steps further comprise performing a K-means clustering operation on the N level digital image, wherein $K = M$.

18 (previously presented). The method of claim 16 wherein the first and last levels of the M levels are predetermined.

19 (previously presented). The method of claim 16 wherein the N level digital image has multiple channels and K-means clustering and multi-level error diffusion are performed on each of the multiple channels independently.

20 (previously presented). The method claimed in claim 16, wherein the N level digital image has multiple channels and K-means clustering and multi-level error diffusion are performed in multi-channel vector space.

21 (currently amended). A method for multitone processing an N level digital image to produce an M level digital image wherein M and N have unchanging values and $M<N$, comprising the steps of:

setting initial values of M cluster centers;

assigning pixels of the N level digital image to said cluster centers to provide assigned pixels;

calculating new values of said cluster centers based upon respective said assigned pixels;

repeating said assigning and calculating until a predetermined stopping condition is reached and, thereby, final values of said cluster centers are defined;

selecting said final values of said cluster centers as reconstruction levels; and

applying multilevel error diffusion to the N level digital image using said reconstruction levels to produce the M level digital image.

22 (previously presented). The method of claim 21 wherein said assigning minimizes respective mean squared error.

23 (previously presented). The method of claim 21 wherein said stopping condition is a predetermined threshold.

24 (previously presented). The method of claim 21 wherein first and last of said reconstruction levels are predetermined.

25 (previously presented). The method of claim 21 wherein the N level digital image has multiple channels and said setting, assigning, calculating, repeating, selecting, and applying steps are performed independently on each of said multiple channels.

26 (previously presented). The method of claim 21 wherein the N level digital image has multiple channels and said setting, assigning, calculating, repeating, selecting, and applying steps are performed in multi-channel vector space.